

## NOTES.

SIR GEORGE STOKES has been elected an Associate of the Paris Academy of Sciences.

WE learn that the name of Dr. William Osler, F.R.S., at present superintendent of the Johns Hopkins Hospital at Baltimore, is being mentioned in connection with the vacancy in the Chair of Medicine at Edinburgh.

AN extra meeting of the Chemical Society will be held on Thursday, March 8, when a lecture, "On Recent Researches on Nitrification," will be given by Prof. Warington, F.R.S. The chair will be taken at 8.30 p.m.

THE Paris Geographical Society has awarded its annual grand gold medal to Major Marchand, and silver and bronze medals to other members of his expedition.

ON the 28th inst. Mr. Robert H. Scott will retire from the post of secretary to the Meteorological Council. At the end of the year 1899 Mr. Scott had completed thirty-three years of service in the Meteorological Office, and for the last twenty-five years has acted as secretary of the International Meteorological Committee, which honorary position, we understand, he will continue to hold until the next meeting of that committee in September. Mr. W. N. Shaw, F.R.S., Fellow of Emmanuel College, Cambridge, and hitherto assistant director of the Cavendish Laboratory, and lecturer in physics in the University of Cambridge, has been appointed as successor to Mr. Scott. Mr. Shaw has been a member of the Meteorological Council since May 1897, and will continue to hold that position in addition to that of secretary.

AT the annual meeting of the Russian Geographical Society, on February 7, the great Constantine medal was awarded to A. M. Pozdyéeff for his work, "Mongolia, and the Mongols," and other works upon the same country; the Count Lütke's medal to L. K. Artamonoff for geodetical and geographical work in Caucasus, Persia, and Abyssinia; the Semenoff's gold medal to E. W. Brettschneider for his extensive work, in English, "History of European Botanical Discoveries in China"; the great gold medal of the Society to N. A. Marrusa for his collection of the parables of Wordan; and the Prjevalsky medal to E. E. Anert for his geological work in Manchuria. Three small gold medals were awarded to R. N. Savélieff for meteorological work, N. N. Lelyakin for astronomical calculations, and to V. N. Iochelson for a communication on the nomads of the tundras of North-east Siberia. It is interesting to note that the Semenoff silver medal was awarded this year to Madame M. A. Lyamina for her works popularising the results obtained by the Russian travellers, whose splendid full reports, published in stately quarto volumes, remain, as has often been pointed out in these columns, inaccessible to the general reader. Eleven more silver medals and five bronze medals were given to different persons for minor works.

THE death is announced of Dr. Hermann Schäffer, honorary professor of physics in the University of Jena.

THE March exhibition at the Royal Photographic Society will be provided by the National Photographic Record Association, and will be opened on Wednesday, March 7, by Sir Benjamin Stone, M.P.

DR. SCHWENDENER, professor of botany at Berlin, has been elected a correspondant of the Paris Academy of Sciences, in the section of botany, in succession to the late Baron F. de Müller.

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THE meeting of the Physical Society to-morrow (February 23) promises to be of special interest. Prof. R. W. Wood, of the University of Wisconsin, U.S.A., is to describe his recent investigations in optics, and will exhibit some of the apparatus used in those experiments, together with photographs demonstrating the evolutions of reflected wave fronts.

THE committee of the Athenæum Club, acting under the rule which empowers the annual election of nine persons "of distinguished eminence in science, literature, the arts, or for public services," have elected Dr. David Gill, C.B., F.R.S., Astronomer Royal at the Cape of Good Hope, a member of the Club.

AUSTRIAN geology has suffered a severe loss in the death of Mr. K. M. Paul, chief geologist on the Austrian Geological Survey, on February 10, at the age of sixty-two. While his chief work was the investigation of the geological structure of the Carpathians and of the environs of Vienna, his intimate knowledge of the geology of Galicia led to his being regarded as one of the leading authorities on the occurrence of petroleum.

THE anniversary meeting of the Geological Society was held on Friday, February 16. The officers were appointed as follows:—President: Mr. J. J. H. Teall, F.R.S.; Vice-Presidents: Prof. J. W. Judd, C.B., F.R.S., Mr. Horace W. Monckton, Prof. H. G. Seeley, F.R.S., and Prof. W. J. Sollas, F.R.S.; Secretaries: Mr. R. S. Herries and Prof. W. W. Watts; Foreign Secretary: Sir John Evans, K.C.B., F.R.S.; and Treasurer: Dr. W. T. Blanford, F.R.S. The medals and funds awarded, as already announced (p. 279), were presented. The President delivered his anniversary address, which dealt chiefly with the present state of knowledge regarding underground geology in the south-east of England.

AT a special meeting of the Manchester Literary and Philosophical Society, held on February 13, Prof. Horace Lamb, F.R.S., being in the chair, the Wilde Medal for 1900 was presented to Lord Rayleigh for his numerous and brilliant contributions to mathematical and experimental physics and to chemistry. A Dalton medal, struck in 1864, was presented to Sir Henry Roscoe, F.R.S., for his remarkable original researches in chemistry, and for his distinguished services to scientific education. The third award, which was to Prof. A. W. Flux, was that of the Wilde premium of fifteen guineas for two much appreciated papers on "The cost of sea transport in proportion to values of cargoes," and "The fall in prices during the past twenty years." After the presentation of the medals, Lord Rayleigh proceeded to deliver the Wilde lecture, for which he took as the subject, "Flight, Natural and Artificial."

WE learn from the *Electrician* that the late Prof. D. E. Hughes has bequeathed the sum of 2000*l.* for the foundation of a "David Hughes Scholarship" in connection with the Institution of Electrical Engineers. The text of that portion of the will which relates to the bequest is as follows:—I direct and declare that the legacy of two thousand pounds, so bequeathed to the said Institution of Electrical Engineers, of which I am Past President, shall be invested by them in any manner for the time being authorised by law for the investment of trust funds, for the purpose of founding in connection with that Institution a Scholarship Fund, to be called the David Hughes Scholarship Fund. And I direct that the annual income produced by the investments for the time being constituting the fund shall be given each year to a student preparing himself for the career of an electrical engineer, under conditions similar in all respects to those under which the fund now known as the Sir David Salomons Scholarship Fund is administered, but so that if and so often as for any reason the Scholarship hereby founded shall not be for any given year awarded to any student, the annual

income of the Fund for that year shall be invested in manner aforesaid and added to the capital of the David Hughes Scholarship Fund.

PROF. H. A. HAZEN, a prominent official of the U.S. Weather Bureau, whose name will be familiar to many readers of NATURE, was, we regret to learn, thrown from his bicycle on January 22, and died on the following day, from the injuries received. Referring to his lamented death, the *National Geographic Magazine* states that he was born on January 12, 1849, in Sirur, India, about one hundred miles east of Bombay, and went to America when ten years old. He graduated from Dartmouth College in 1871, and for some years after was instructor in drawing in the Sheffield Scientific School, New Haven, and later was assistant in meteorology and physics under Prof. Elias Loomis. He received an appointment in the U.S. Weather Bureau in May, 1881, being assigned to special duty on such problems as the investigation of the psychrometer and the proper exposures of thermometers, the study of thunderstorms, and other important questions. At a later period Prof. Hazen was assigned to duties of a broader aspect, including weather forecasting and occasional editorial work on the *Monthly Weather Review*. In addition to his official work in the Weather Bureau, Prof. Hazen was a frequent contributor to meteorological and other scientific journals. He was one of the supporters of *Science* during the years 1882-1889, and of the *American Meteorological Journal*, 1884-1886. Among his larger publications are the "Reduction of Air Pressure to Sea Level" and the "Climate of Chicago."

THE address which Dr. Morris delivered at the opening of the second West Indian Agricultural Conference, of which an account is given in another part of this issue, was a powerful exposition of the aims of the Agricultural Department, and of the success which had attended its efforts during the first brief year of its existence. It is gratifying to find that, with regard to the question of central factories, Dr. Morris gives the great weight of his approval to the representations made by the Barbados Agricultural Society in favour of the establishment of factories on the basis of a division of profits between the planters and the factory. Not the least interesting portion of the address is that dealing with agricultural education. The education which has drawn the Englishman from the soil at home, and so divorced him from agricultural pursuits that, even as an emigrant, he is only a settler in towns, has been copied in the West Indies; and the results, although not so evident perhaps in Barbados, have been identical. Dr. Morris shows that the aim of the Department will be to correct this system, not by refusing education to the agricultural masses, or by restricting their education to purely agricultural subjects, but by expanding the teaching now afforded at elementary schools, so as to embrace a large amount of valuable agricultural knowledge. The ultimate effect of the efforts of the Department in this direction must be the creation of a sturdy and intelligent peasant proprietor in the colony, most adapted to their requirements; whilst the supply of labour on the estates will be affected only in the improved value, not cost, of the labourer.

MANY attempts have been made to construct a compass which is independent of the permanent and transient sources of error to which a ship's compass is subjected. The latest device is the Evoy patent compass, which is so arranged that it can be placed in a position where it is not subject to the magnetism of the ship—that is to say, it is hauled up to nearly the height of the masts, where it is supported on the jumper stay. To determine whether the steering compass of a ship is showing the correct magnetic course, the Evoy compass is hoisted up aloft, given time to settle, and then brought down again, the reading of the

steering compass being taken at the same time. It is obvious, however, that in the course of being lowered the overhead compass would come again within the magnetic influences of the ship, and thus be liable to have its reading disturbed before being inspected by the officer on duty. An automatic contrivance is therefore provided which locks the compass card as soon as the lowering is begun. Hence it is possible to check the indications of the compass on the bridge, exposed to the perturbing influences of the ship's magnetism, by those given by the Evoy compass high up beyond their reach. The instrument, which is mounted in such a way as to protect it from the effects of vibration and rolling, has been tested for some time on board a number of vessels, and has, it is stated, given satisfaction to the commanders.

THE recent falls of snow, which have been followed by heavy rains and rapid thawing, have led to disastrous floods in several parts of England. One lesson that is taught, is that homes (usually of the poor) should never be erected on alluvial ground. In the *Standard* of February 17, we read that the river Avon at Bath has been greatly swollen, and in the low-lying parts of the city people have been driven into the upper rooms, and have had to be supplied with food by means of boats. Interesting and yet deplorable are the records of the floods in South Devon. The thawing of snow on Dartmoor, accompanied by twenty-four hours' continuous rain, rapidly swelled the waters of the river Dart, and the outflow was checked by high spring-tides. Consequently (as stated in the same newspaper) the alluvial meadows were soon submerged, the floods being the highest within living memory. Many hundreds of sheep, horses, pigs, and other live stock were washed away by the force of the current. From one farm on the borders of the Dart no less than 232 sheep were drowned, and the banks were strewn with dead animals, trees, and other débris. We learn also that at Guildford the ancient town bridge has been completely carried away by a big baulk of timber, which was brought down by the flooded river Wey, from a neighbouring timber-yard.

A BILL for taking the census in Great Britain in 1901 was read for the first time in the House of Commons on Monday. The subject of census-taking and its limitations was brought before the Royal Statistical Society at the meeting on Tuesday, by Mr. J. A. Baines, who pointed out that the main interest of the census from the statistical standpoint lies, of course, in the schedule. The attempt to make the census the vehicle of a plebiscite on any matter of opinion, whether of temperance, volunteering, the empire, or such like, is foredoomed to failure, and tends to discredit the rest of the inquiry. Purely personal facts, such as sex, age, marriage and birthplace are the most important questions, and, luckily, the easiest to answer correctly. On the other hand, they are those which, in the mass, tend to vary more quickly in this country than any others. It is imperative, therefore, that for practical statistical work we should have the two first, at least, revised at more frequent intervals than ten years, and the Statistical Society has fortunately the co-operation of actuaries, sanitary officers, economists, and all social investigators in pressing upon the Government the need of either a permanent quinquennial Census Act, or, at least, the prescription of a quinquennial enumeration in the Bill now under consideration.

PROF. E. H. BARBOUR, professor of geology in the University of Nebraska, has recently given reasons for believing that a rapid decline of geyser activity is taking place in the Yellowstone National Park. If the present rate of decline continues, it seems possible that within a decade many of the well-known geysers will have died out. As a result of an examination of the geyser area, after an interval of four years, Prof. Barbour gives the following instances among others of the

diminution of activity which has occurred : The Fountain Geyser, which was such a favourite that the Fountain Hotel was situated at that spot, is now wholly extinct, and a very inferior substitute named the Dewey Geyser has taken its place. The Cascade Geyser, another favourite because of the frequency of its eruptions (about every fifteen minutes), has dropped to an eruption interval of once every twenty-four hours. The Grand Geyser, which used to burst out once a day, was only active three or four times the past season. The Beehive Geyser, active in 1895, is supposed to be wholly extinct. Old Faithful seems as fine as ever, but the interval of eruption is now about seventy-five or eighty minutes instead of once an hour. If it is possible to judge fairly of such matters, there seems to be increasing activity in the ebullition of the water in that greatest of geysers, the Excelsior, which leads to a feeble hope that it may possibly be rejuvenated yet once again. An apparent increase in the activity of the Mud Geyser has also been remarked ; but in spite of these cases, on the whole it appears that a distinct decline of activity is taking place.

THE Meteorological Council have just issued a discussion of the diurnal range of rain at the seven observatories in connection with the Meteorological Office, for the years 1871-90. The tables show, *inter alia* : (1) the total monthly and yearly amounts for each hour ; (2) the average hourly rainfall for one day in each quarter, and for the whole year ; and (3) the frequency of its occurrence for each hour, expressed in percentages ; and the tables are accompanied by diagrams. England is represented by three stations—Falmouth, Stonyhurst and Kew ; Scotland by two—Glasgow and Aberdeen ; and Ireland by two—Valencia and Armagh. The year, as a whole, does not exhibit any well-defined distribution of quantity. The western observatories show that the heaviest rains occur in the early morning, and that the least rain falls in the early afternoon ; while the inland and eastern observatories show that the heaviest rains fall in the afternoon. The frequency with which rain falls at the different hours of the day gives more regular results than can be obtained from the hourly distribution. The general conclusion drawn by Dr. R. H. Scott, who has carried out this useful investigation, is that everywhere in the British Islands the forenoon hours, from about ten o'clock, are drier than the rest of the day, and that although the temperature has not then nearly reached its maximum, invalids would be less likely to get wet if they went out in the morning. In the neighbourhood of London, however, there is very little evidence at any season of the year of a maximum frequency of rain.

A DESCRIPTION of an aluminium cable used by the Hartford Electric Light Company as a three-phase line, to convey the current over a distance of more than eleven miles, is given in the New York *Electrical Review*. This is another case in which aluminium has been successfully used as an electrical conductor. The trial stage is now passed, and aluminium conductors have been proved to stand the test of practical working under many different conditions, and for continued periods of time. The high price of copper is responsible for the increased use of aluminium as a substitute for it. The difference in specific gravities between copper and aluminium is as 1 : 3.33 and with a conductivity of 60 per cent. that of copper, there is an actual difference in weight between an aluminium and a copper line of about 50 per cent. This fact was very noticeable in putting up the Hartford wire, it being very much more readily handled in the stringing. An objection has been raised to the use of aluminium from the fact that the diameter is necessarily increased. This is true, but in ordinary circumstances an increase of 20 per cent. in the diameter of a conductor is not of great importance, and the objection applies only

to conductors that are carried in ducts or conduits where space is necessarily limited. Official tests have been made under the direction of the Hartford Electric Light Company's experts, and the guarantees have been fully equalled, and in some cases exceeded. The line has worked perfectly from the time the generators were started, and has been accepted by the company. Some of the American plants equipped with aluminium wire are carrying much higher voltages than this particular line, which was constructed for 20,000 volts.

A USEFUL paper by Mr. H. N. Dickson, entitled "The mean temperature of the surface waters of the sea round the British coasts, and its relation to the mean temperature of the air," was recently communicated to the Royal Meteorological Society (*Quarterly Journal*, vol. xxv. No. 112). The paper was based on observations taken during eighteen years, 1880-97, at the instance of the Meteorological Council, with the co-operation of the Coast Guard and the various Lighthouse authorities. The observations, which were taken about sunrise and 4h. p.m., have been carefully sifted by Mr. Dickson, and the monthly and yearly averages calculated, tabulated, and plotted on small charts. The extent of the daily range appears to depend on local conditions, such as the speed and duration of tidal streams, the extent of shallow water, &c. The stations on the west coast give a daily mean range for the year of 0°.7, those in the North and Irish Seas give a daily range of 0°.8. With regard to the yearly distribution of temperature, the average at the entrance to the English Channel is about 54°, on the south-west of Ireland 52°. The mean of 49° persists along the north coast of Ireland and the west coast of Scotland to Stornoway. After leaving the Straits of Dover the mean falls to 50° off Suffolk and Norfolk, declining to 48° off the coast of Northumberland, and to 47° at the Orkneys and Shetlands. A comparison of the mean annual temperatures of air and sea shows that the mean excess of sea over air never exceeds 2° ; a difference of 1°.7 is only reached or exceeded off the west coast of Ireland, and the south-east coast of England. On the south coast of Ireland, south-west of England and the extreme north of Scotland, the difference is about 1° ; in the Irish Sea and the east coast of Scotland about 0°.5, and on the east coasts of England still less. One important conclusion drawn by the author is that the mere presence of Atlantic water is more effective in depressing the summer temperature than in raising that of the winter months. Apart from the value of the paper as a contribution to climatology, it will be of special importance in investigations connected with questions of fisheries.

IN the *Physical Review* for December 1899, Mr. E. H. Loomis describes experiments on the freezing points of solutions, conducted with the object of testing the validity of the van't Hoff constant for dilute aqueous solutions of non-electrolytes. The method of determining the freezing points of dilute solutions is one introduced by the author in 1893, and has been used to find the molecular depressions of a large number of non-electrolytes in aqueous solution, and it is found that the van't Hoff constant is exactly verified in all cases examined, except methyl-alcohol, ethyl-alcohol and ether. The experimental value is found to be 1.86.

A REPORT on units of heat, drawn up by E. Warburg for the Naturforscherversammlung in Munich of September last, has been reprinted by Johann Ambrosius Barth, of Leipzig. The report deals with the absolute units, the erg and joule, and their relations with practical units, viz. the "calories" in which water at 0° and at 15° are taken respectively as standards, and the mean water-calorie between 0° and 100°, also the temperature variations of the specific heat of water, especially in the neighbourhood of its maximum.

PROF. J. MASSAU, of Ghent, sends us a lithographed paper on the graphic integration of partial differential equations. It is divided into three chapters, dealing with integration by elements, integration equations of the first and second orders and of simultaneous linear equations by means of characteristics, and applications to variable motion of fluids, under which latter heading may be included finite wave-motion, and the formation of bores. A somewhat analogous problem, viz. the approximate integration of partial differential equations of the first order of the form  $p+qf(x,y)=0$ , subject to the condition that  $f(x,y)$  is real, finite, single valued, and continuous in an assigned region C, and that  $q$  is also continuous, is treated by Dr. C. Severini in the *Rendiconti del R. Istituto Lombardo*, xxxii. 19, 20, who shows that the integral of the equation can be represented to any degree of approximation by means of a rational integral polynomial in  $x$  and  $y$ .

STIMULATED by the disastrous Constantinople earthquake of July 10, 1894, the Sultan of Turkey ordered that observations of earthquakes should be regularly made within his empire, and the Director of the Meteorological Observatory was fortunate enough to secure the assistance of Dr. G. Agamennone, of Rome (see NATURE, vol. lii. p. 4). During the years 1895 and 1896, this well-known seismologist created an organisation for the collection of earthquake records over the whole of the south-east of Europe and Asia Minor, and the results for 1895 and the early part of 1896 were published in monthly bulletins, issued by the observatory. For reasons, which are unknown, the authorities refused to continue printing these valuable lists, and, on the departure of Dr. G. Agamennone, the whole organisation was allowed to lapse. Fortunately, a copy of the records for 1896 was preserved, and has recently been published in Gerland's *Beiträge zur Geophysik*. This valuable paper contains a list of more than 400 earthquakes, as well as detailed descriptions of the more important shocks. It is a monument of what can be accomplished, even in a semi-civilised country, by the energy of one man.

DR. D. G. ELLIOT is continuing his studies in North American mammals in the *Publications of the Field Columbian Museum*: the last part with which we have been favoured treating of collections from Oklahoma and Indian Territories. A feature of Dr. Elliot's is the attention bestowed on the habits of animals, the present part describing the nests of the wood-rats (*Neotoma*).

To the *Memorias de la Sociedad Científica "Antonio Alzate,"* issued at Mexico, Prof. R. Manterola contributes a paper on longevity in connection with mental work. The author divides professions into three groups, according to their influence on longevity; and it may be satisfactory to scientific workers to learn that they occupy a high position in the most favoured group. In mental workers the general average of life is stated to be above 68 years, and the average of men of science, lawyers and historians more than seventy.

IN the December number of *Natural Science*, Mr. Barrett-Hamilton draws an interesting parallel between the occurrence of portions of the skin of the "last of the Ground-Sloths" in Patagonia, and of similar remains of Lemmings in a Portuguese cave. The latter animals are now unknown south of lat.  $58^{\circ} 30'$ , yet the Portuguese remains present the appearance of having belonged to animals recently dead. The inference is that even in comparatively damp climates, the shelter of a cave, with abundance of dry dust, is sufficient to preserve some of the soft parts of animals for very long periods.

WE have received from the trustees of the Indian Museum, Calcutta, a newly published "Guide" to the collection of fishes exhibited in what was formerly the library of the Geological Survey. Dr. A. Alcock is the author of this useful

little pamphlet, which not only contains a well-written dissertation on the structure of fishes in general, as well as a classified synopsis of the families, but has a special section on the geographical relations of the marine fishes of India. Among the exhibits are models of deep-sea fishes; and it may be suggested that a similar series would be of great interest if added to our own national collection.

IN the February issue of the *Quart. Journ. Microscop. Soc.*, Mr. J. P. Hill, of Sydney, continues the account of his important researches into the embryology of the marsupials. His discovery of the existence of a distinct placenta in the Bandicoots (*Perameles*) will be fresh in the minds of our readers, and likewise the inference that the retention of such a structure indicates a primitive condition. His subsequent investigations have led the author to the significant conclusion that the urino-genital organs of the Bandicoots are in a condition which may be described as persistently embryonic, and thus much more primitive than in any other known marsupial. Accordingly, all the available evidence points to the view that the marsupials originally developed a placenta, which has been aborted in the more specialised forms. The second part of the present communication deals with the foetal membranes of one of the Wallabies.—To the same journal Mr. H. M. Bernand contributes a paper on the structure of the retina of the eye in the Amphibia, in the course of which he is led to conclude that the so-called "cones," in place of being important sensor organs, are nothing more than stages in the development of new "rods."

IN these columns mention has already been made of the discovery of a horn of the extinct Aurochs or Ur (*not* the Bison) in a peat bog in Lower Pomerania. This remarkable specimen Dr. Nehring now describes and figures in the *Deutsche Landwirtschaftliche Presse* of February 10. In the course of this article the author mentions that the Aurochs (of which our domestic cattle are the descendants) survived on the Continent till 1627, and that examples of its enormous horns, sometimes mounted as drinking-cups, were preserved in many inns, churches, and castles, especially in South Germany and Alsace-Lorraine, till a comparatively recent date. In 1550 Conrad Gesner, for instance, mentions having seen skulls, with the horns, of Aurochs at old hostels in Worms and Mayence. Till as recently as the first French Revolution, two Aurochs' horns were preserved in Alsace, the one in the cathedral at Strasburg, and the other in the cellars of the episcopal palace at Zabern. The first measured  $6\frac{1}{2}$  feet in length, while the second held four litres. Since both are now lost, the newly-discovered sub-fossil specimen is of priceless value.

IT appears from the annual meeting, on January 28, of the Russian Institute of Experimental Medicine (Pasteur Institute) that its activity is steadily developing. The number of its provincial branches has been increased this year by a branch opened in Transbaikalia for the study of rinderpest in East Siberia. More than fifty papers, some of which are of great value, have been read at the meetings by Drs. Nencki, Pavloff, Vinogradski, Semenoff, Lukianoff, Vladimiroff, Dzerzgowski, Schultz, and their pupils. The most important of them was perhaps the paper, read by Prof. A. M. Lévin at the annual meeting, on the bacterial origin of scurvy. No less than 80,000 scurvy patients were registered last year in the provinces which had suffered from famine (755,000 for the last eleven years). The epidemical character of scurvy became well established by the last few years' observations, and Prof. Lévin eventually obtained pure cultures of the bacteria of scurvy. They have the shape of rods, with rounded ends, have no cilia and give no spores. They are similar to diplococci, and belong to the group of bacteria which are well known as the cause of chicken-

cholera. Scurvy would thus appear "as a chronic form of this latter disease." During the last year the Institute was also very active in preparing malleine and tuberculin (30,000 bottles), anti-diphtheria serum (33,000 bottles), anti-plague serum (8220 cubic centimetres), anti-plague lymph (400,000 c.c.), and various bacteria-cultures (about 1500). Anti-rabic treatment was resorted to in 745 cases, and the grand total of all deaths amongst this large number of patients was only 1 per cent. The Institute has had this year at its disposal a total of 35,000*l.* (350,000 roubles). The subscriptions for a monument to Pasteur now reach a total of 1400*l.*

THE present status of rice culture in the United States is reported upon by Dr. S. A. Knapp in *Bulletin No. 22* of the U.S. Department of Agriculture (Division of Botany). The United States at present produces about half the quantity of rice consumed. In the case of other cereals, an enormous supply is exported. In the introduction to Dr. Knapp's report, Mr. F. V. Coville points out that this anomalous condition is due to the fact that rice, in addition to its tropical or subtropical character, is a crop grown chiefly on wet lands, where it has hitherto been impossible to use harvesting machinery. The crop must therefore be cut with a sickle, and American hand labour has been thrown into competition with the cheap labour of the tropics, a competition that has not proved profitable to the American. A new system of rice culture has, however, been developed in south-western Louisiana, by which, as now perfected, the elevated and normally or periodically dry prairie lands are flooded by a system of pumps, canals, and levees, and when the rice is about to mature the water is drained off, leaving the land dry enough for the use of reaping machines, shown at work in the accompanying illustration. Under this system the cost of harvesting, and therefore the total cost of production



Harvesting Rice in South-Western Louisiana.

have been greatly reduced and the industry has undergone a rapid development. It was found, however, that a large proportion of the grains were broken by the steam-reaping and thrashing machines; so the U.S. Department of Agriculture appointed Dr. Knapp as an agricultural explorer, with instructions to visit Japan, investigate the rices of that country, and purchase a stock suited to meet the requirements of the American problem. Dr. Knapp returned in the early spring of 1899 with 10 tons of Kiushu rice, which was distributed to experimenters in south-western Louisiana and elsewhere in the rice belt. The result of the milling tests are now awaited. If the high milling quality of the Kiushu rice is maintained under the new cultural conditions, the last apparent obstacle to the complete success of an American system of rice cultivation will be removed. The action of the Secretary of the Department of Agriculture in thus making an attempt to improve an industry by a scientific examination of the conditions of cultivation is one of many similar examples of a far-seeing policy.

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UNDER the title "The Nature and Work of Plants," Messrs. Macmillan and Co. are about to issue a simple introduction to botany, by Dr. Macdougal. It aims at explaining, in a way that beginners can easily understand, the purpose of a plant's different organs, the conditions of plant-life, and the effect of it on other forms of life.

THREE characteristic letters from De Morgan to Sylvester, written in 1856, when Sylvester was professor of mathematics at the Royal Military Academy, Woolwich, appear in the January number of the *Monist*, with an introductory note by Dr. G. B. Halsted.

A COPY of the eleventh issue of the annual volume on the wealth and progress of New South Wales, by Mr. T. A. Coghlan, Government statistician, has been received. The volume runs into nearly eleven hundred pages, and is full of interesting information concerning the natural resources, development, and present position of the Colony.

THE Geological Photographs Committee of the British Association have issued a circular announcing that they are prepared to undertake the reproduction, in platinotype prints, or as lantern slides, of a number of the views in their excellent collection. Such a set of pictures would be of great value to lecturers, teachers and students, both at schools and at higher educational institutions. Curators of museums, also, would find in the pictorial epitome of British geology which the illustrations would furnish, a very appropriate and instructive decoration. Prof. W. W. Watts, Mason University College, Birmingham, will send particulars of the scheme to any one who wishes to have them.

"WILLING'S PRESS GUIDE," or 1900, is a useful list of British, Colonial, and foreign newspapers and periodicals, classified under various heads for convenience of reference. In the classification according to interests, professions, trades, religious denominations, sciences and other subjects, we notice one or two curious entries. For instance, the "Astronomical Observations of the Cambridge University Observatory" and "Astronomical Observations and Researches made at Dunsink" can hardly be designated periodicals. Under the heading of Science, we find *Science and Art*—which has long ceased to exist—a journal of a local scientific society, the Report of the British Association, and a college magazine, but NATURE is omitted, though, we hasten to add, it is included in the alphabetical list. With the exception of this misleading classification of scientific publications, the "Guide" is a well-arranged book of reference to the newspaper press.

THE "Catalogue of Nests and Eggs of the Birds of Australia," by Mr. Alfred J. North, Ornithologist to the Australian Museum, which was published by the Trustees of the Australian Museum in 1889, as No. 12 of their series of Catalogues, is now out of print, and the Trustees have decided to issue a new work in an enlarged form by the same author. There will be representations of about 600 eggs on thirty full-sized plates, and arrangements are being made to have them hand-coloured for those who desire it. Some of the nests and breeding haunts of the birds will also be shown on full-sized plates, but the greater number will be interspersed among the text, where also a large number of the birds themselves will be figured. The photographs, from which the plates representing the nests are made, have mostly been taken by the author personally, many of them *in situ*, and show the actual surroundings of the birds' homes. The black and white drawings of the birds are by Mr. Neville Cayley, so well known for his life-like drawings and paintings of birds. The letterpress will contain descriptions of the birds, their nests, eggs and haunts, and an account of their life-history. The

preparation of the plates is now well advanced. The work will be issued in parts as fast as the letterpress can be got ready.

VOLURIC acid has already been utilised in calorimetric investigations in support of the ionic hypothesis, and in the current number of the *Berichte* another physical constant, the electrical conductivity, of this acid now gives rise to some interesting speculations by Prof. Abegg, as to the changes preceding ion formation. Starting with the experimental work of Guinchard on the conductivity, and applying the well-known van't Hoff formula, the heat of dissociation of violuric acid is determined from the temperature coefficient of its dissociation constant, the values being -3970 calories between 0° and 25° C., and -3470 between 25° and 35° C. This is about ten times the usual order of magnitude for acetic acid and most of the other weak acids, and hence leads to the very plausible assumption that here, as in other cases, the greater part of the heat of dissociation is absorbed in intramolecular reactions which precede the formation of the ions. In support of this is adduced the high value found for the heat of dissociation of hydrofluoric acid (-3550), as compared with the values for the other halogen acids. Here the molecules are known to be H<sub>2</sub>F<sub>2</sub>, giving first HF molecules, and finally ions. Water behaves similarly.

THE anomalous value obtained for the atomic weight of tellurium, when viewed from the standpoint of the Periodic Law, has led to numerous experimental researches upon this constant. The value found has usually been higher than Mendeléeff's generalisation requires, and some observers have suggested that ordinary tellurium may contain two substances. The February number of the *American Chemical Journal* contains a contribution to this subject by Messrs. Norris, Fay and Edgerley, in which, as a preliminary to atomic weight determinations, the preparation of pure tellurium was attempted. By making use of the properties of basic tellurium nitrate, a metal was obtained free from silver, gold, bismuth, arsenic, antimony, and selenium, a specially delicate method being devised for the detection of traces of the last named. The double chloride of tellurium and potassium was then selected for careful study, being subjected to a series of fractional crystallisations, but no want of homogeneity could be detected in this way. Further attempts are being made upon the dioxide.

THE additions to the Zoological Society's Gardens during the past week include a King Vulture (*Gypagus papa*) from the Rio Purús, presented by Mr. H. A. De Lisle; a Weka Rail (*Ocydromus australis*) from New Zealand, a Common Snake (*Tropidonotus natrix*, albino), British, deposited; two Purple-capped Lories (*Lorius dromicella*) from the Moluccas, purchased.

#### OUR ASTRONOMICAL COLUMN.

COMET GIACOBINI (1900 a).—This comet has been observed several times since its discovery at the Nice Observatory, but its faintness will only permit of its observation with the largest instruments. M. Javelle estimates it to be of the 13th magnitude. A telegram received from Kiel on February 19 gives the following position :—

R.A. 2h. 22m. 3s.) 1900 February 17d. 8h. 2'5m.  
Decl. -1° 19' 27") Nice Mean Time.

The comet has continued its north-westerly movement from Eridanus, the above position being nearly between the stars δ and ο Ceti (Mira).

NEW MINOR PLANET (1899 E.Y.).—Recent observations of this planet have enabled Herr Otto Knopf, of Jena, to revise his elements and ephemeris, and he gives the new computations in the *Astronomische Nachrichten*, Bd. 151, No. 3621.

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#### Elements for 1900 January 1<sup>o</sup>, Berlin Mean Time.

$$\begin{aligned} M &= 19\ 43\ 24'' \\ \omega &= 322\ 58\ 41'4 \\ \Omega &= 89\ 55\ 39'0 \\ i &= 15\ 13\ 23'9 \\ \phi &= 4\ 28\ 33'5 \\ \mu &= 668''.1835 \\ \log a &= 0.483407 \end{aligned}$$

#### Ephemeris for 12h. Berlin Mean Time.

1900.	R.A.	Decl.
	h. m. s.	
Feb. 23	... 4 22 32	... +20 53'5
27	... 25 43	... 21 16'0
Mar. 3	... 29 13	... 21 38'1
7	... 32 58	... 22 0'0
11	... 37 0	... 22 21'6
15	... 41 16	... 22 42'7
19	... 45 46	... 23 3'3
23	... 50 29	... 23 23'3
27	... 55 24	... 23 42'5
31	... 5 0 31	... +24 1'1

HARVARD COLLEGE OBSERVATORY.—In presenting the fifty-fourth annual report of the Harvard College Observatory, Prof. E. C. Pickering, the director, supplies evidence of an unusually large output of work during the past year. With the photometer mounted on the east equatorial, over twenty-nine thousand measures have been made by Prof. O. C. Wendell, including the photometric measurement of Jupiter's satellites while undergoing eclipse, of the planet Eros, and of variable stars of long period. The west equatorial has been employed for visual examination of variables and comparison stars. Good progress has been made with the reduction of the transit observations made by the late Prof. Rogers in the years 1879-1883.

The new 12-inch horizontal meridian photometer has been used in place of the old 4-inch instrument, which is now in Peru. The director has made with this instrument 65,200 photometric settings on 120 nights, and after the year's trial the instrument has proved extremely satisfactory in practice, it being found that stars as faint as the 13th magnitude can be measured at the rate of one a minute, with an error of only about one-tenth of a magnitude.

Under the Henry Draper Memorial, 744 photographs have been obtained with the 11-inch Draper telescope, and 2395 with the 8-inch. The examination of the spectra on these plates has led to the discovery of 23 new variables, 15 of which showed bright line spectra.

At Arequipa, in Peru, 686 photographs have been obtained with the 13-inch Boydon telescope, and 693 with the 24-inch Bruce doublet. It is hoped that the plates of Saturn taken in August 1899 will furnish more accurate data for the orbit of the recently discovered ninth satellite.

At the Blue Hill Observatory the work has been practically confined to obtaining automatic meteorological records of the upper atmosphere by means of kites. The average height reached by the meteorograph was 9650 feet from the ground.

Prof. Pickering makes special mention of the serious consequences to the work of the Observatory which may ensue, owing to the continued fall of interest on the invested capital of the institution.

INTERFERENCE METHOD OF MEASURING SMALL DIAMETERS.—The *Bulletin* of the French Physical Society, No. 143, contains an account, by M. Maurice Hamy, of the application of interference-bands to the measurement of diameters of small celestial bodies. The method, originally suggested by Fizeau in 1868, was put to the test by Stephan in 1873, and has been used by Michelson in 1892, who determined the diameters of Jupiter's satellites with a 12-inch equatorial by this means. M. Hamy's improvement consists in substituting broad slits, allowing more light to pass than the narrow openings employed in previous experiments. For the solution of this problem a suitable formula has been found. The calculated diameters of Jupiter's four principal satellites agree remarkably well with the numbers found by Michelson, and M. Hamy's estimated apparent diameter of the planet Vesta, viz. 0'54", is exactly the value found by Barnard by micrometric observations with the Lick equatorial.